

# Packaged heat pump rooftops

# airtop

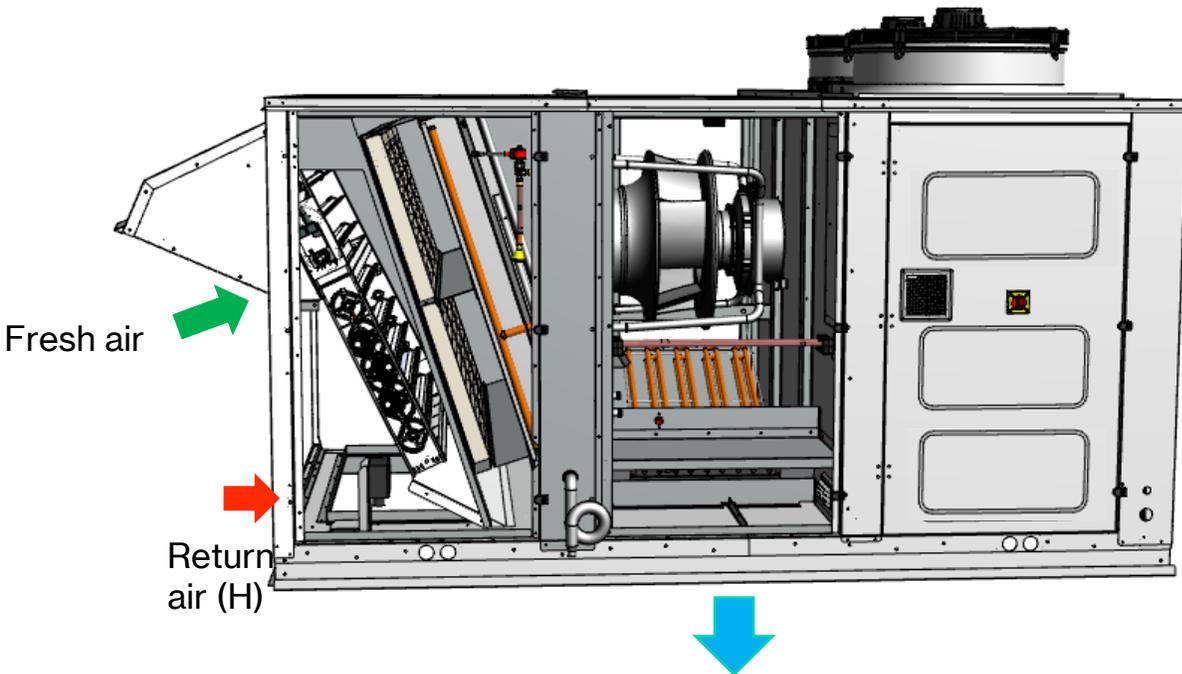
R454B

15-36 kW heating and cooling capacity  
Inverter-driven compressors  
R454B low-GWP refrigerant



# What is a rooftop?

**Rooftops are a cost-effective, pre-engineered way of providing Heating, Ventilation and Air-Conditioning to commercial and industrial buildings.**



- Designed for outdoor use, installed on a roof or slab-mounted on the ground, and connected to the local ductwork
- Air-conditioning and heating is provided by a R454B-based refrigeration circuit. For extreme cold climates, heating can be provided by an auxiliary heater such as a gas burner.
- Ventilation section integrated in the same single frame package with embedded controls.
- The economizer allows pre-conditioning of fresh air to reduce mechanical work, and enables free cooling operation

# Rooftop Applications

Rooftops are a well-known system technology used across a wide spectrum applications. Airtop models are designed for medium to large buildings, both for new installation or renovation projects. Due to their packaged nature, rooftops are suitable for single zone applications.



Gas stations



Restaurants



Cinemas



Retail



Industry



Logistics

# Airtop: a unique family featuring AFD compressor and R454B refrigerant!

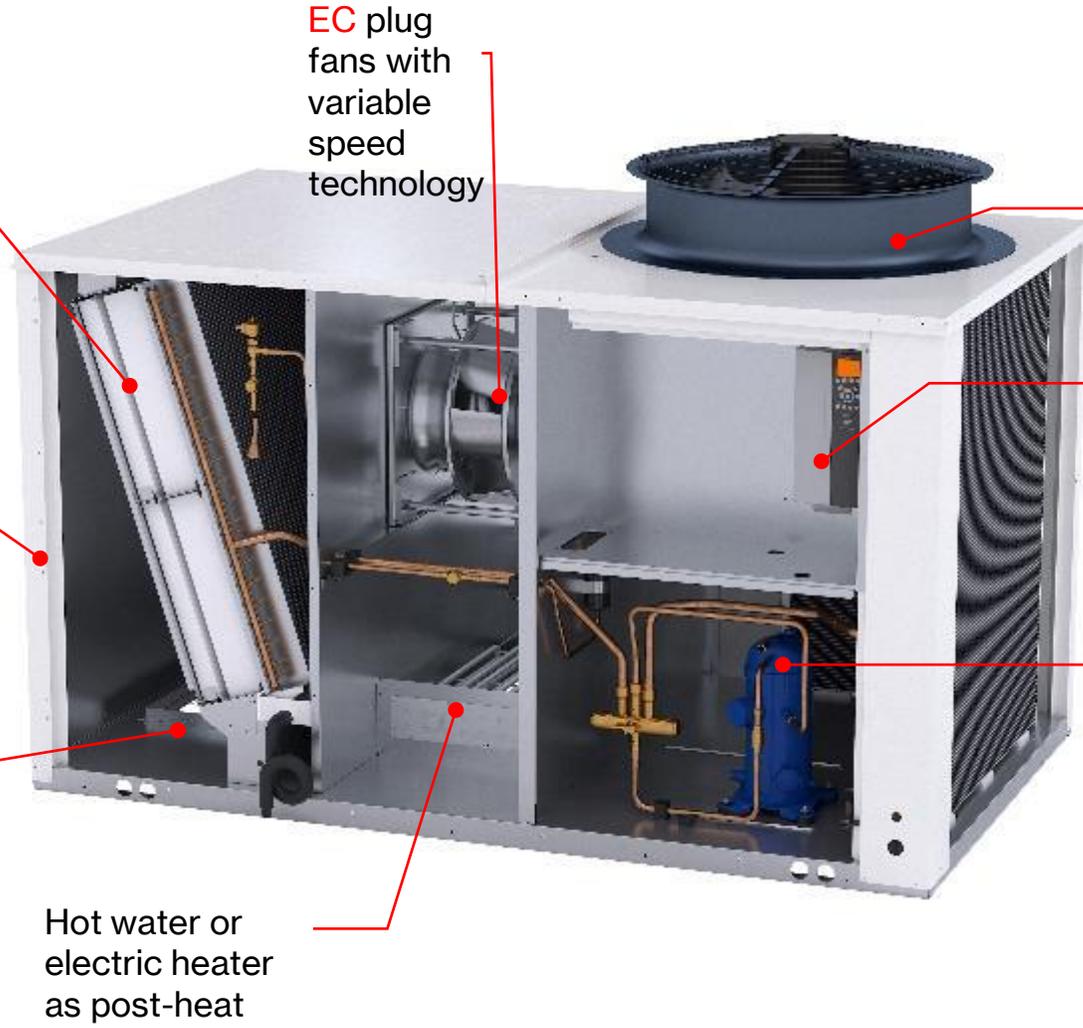
Cooling Capacity 16-38 kW

Heating Capacity 14-37 kW

Air filter isocoarse 55% (G4) as standard, as an option ePM01 55% or 80% (F7/F9)

Dual skin panels with 25mm thickness glass wool insulation (including the corners)

Horizontal or downflow air flow configuration



EC plug fans with variable speed technology

EC Axial fans with variable speed

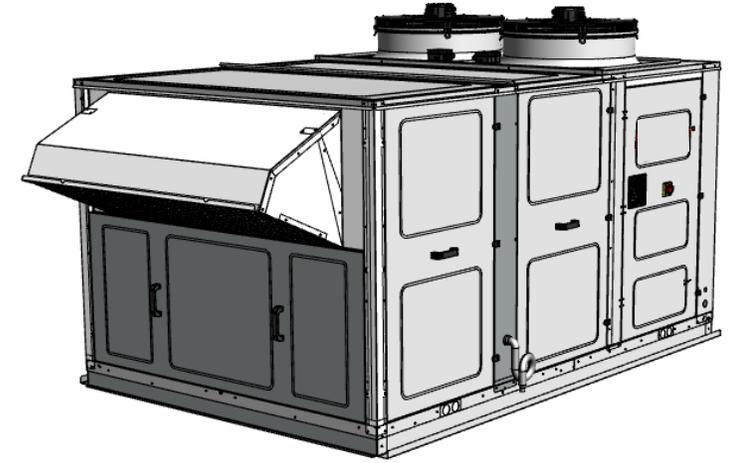
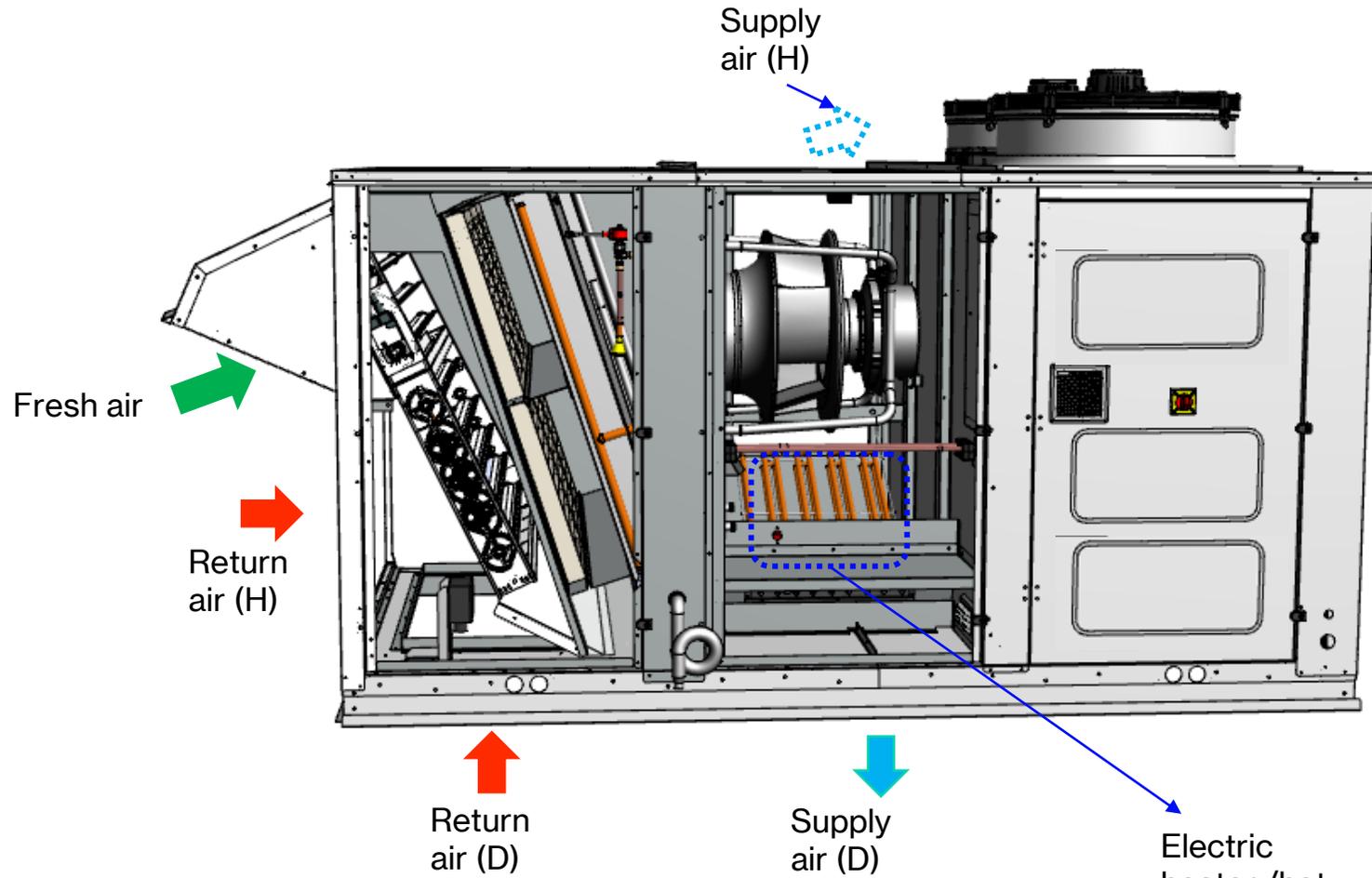
Embedded controller, pre-wired and preconfigured from the factory for quick start-up and commissioning

Variable speed scroll compressor with permanent magnet motor

Hot water or electric heater as post-heat

**FULL INVERTER !**

# Unit with Economizer sizes 017-036



- (D) = Downflow configuration
- (H) = Horizontal configuration

# System air balance - Different pressurization controls

Increase of AESP on return



STANDARD

Variable  
Airflow

- Supply fan (STD)
- Direct drive Fan with EC Motor.
- Variable airflow in standard.
- Airflow measurement in real time



Barometric  
Damper

- Barometric Damper is optional
- No pressure control
- Damper open when outdoor pressure < indoor pressure.
- % of Exhaust air is driven by the Economizer

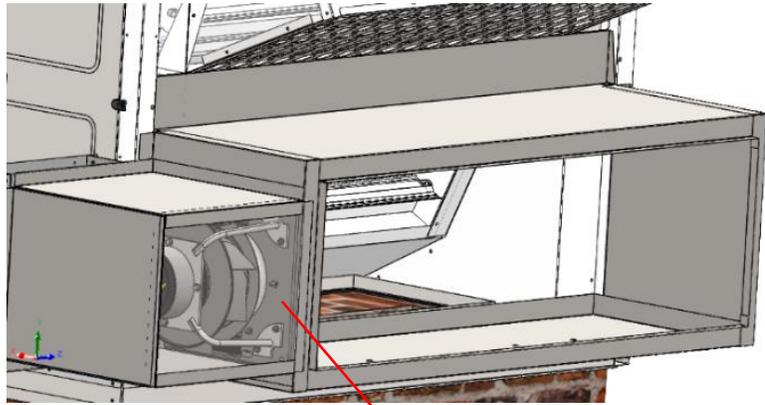


Exhaust Fan

- EC motor fans – 250 -400 Pa
- Maximum extracted airflow: 40% (AC) up to 100% (EC) of supply airflow

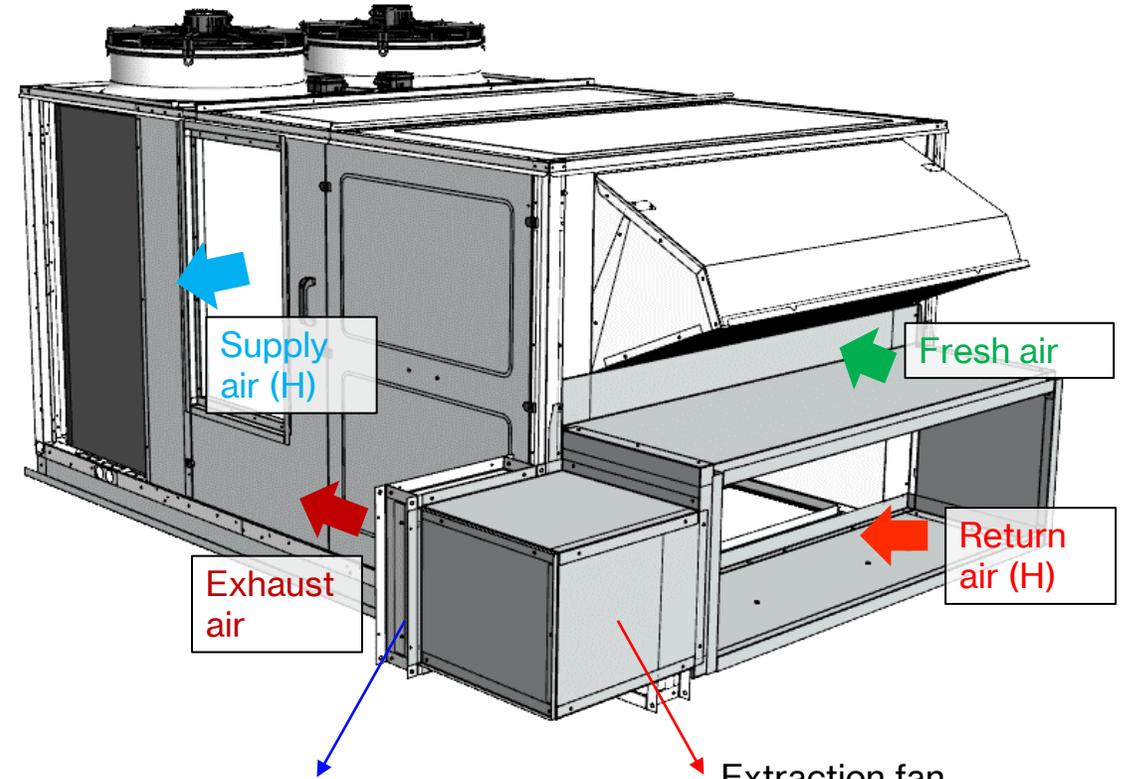
# Unit with Economizer and Extraction fan sizes 017-036

Extraction fan is an optional, it's an **EC plug fan type** that guarantees **up to 150 Pa AESP at 4000 m<sup>3</sup>/h**. Barometric relief damper is included. Downflow or horizontal air flow configuration are both available



Extraction fan

Size	IH017	IH019	IH027	IH030	IH036
max air flowrate exhaust fan [m <sup>3</sup> /h]	4000	4000	4000	4000	4000
nominal air flowrate (supply fan) [m <sup>3</sup> /h]	3600	4200	5000	6600	7800
Max percentage of extraction	100%	95%	80%	61%	51%



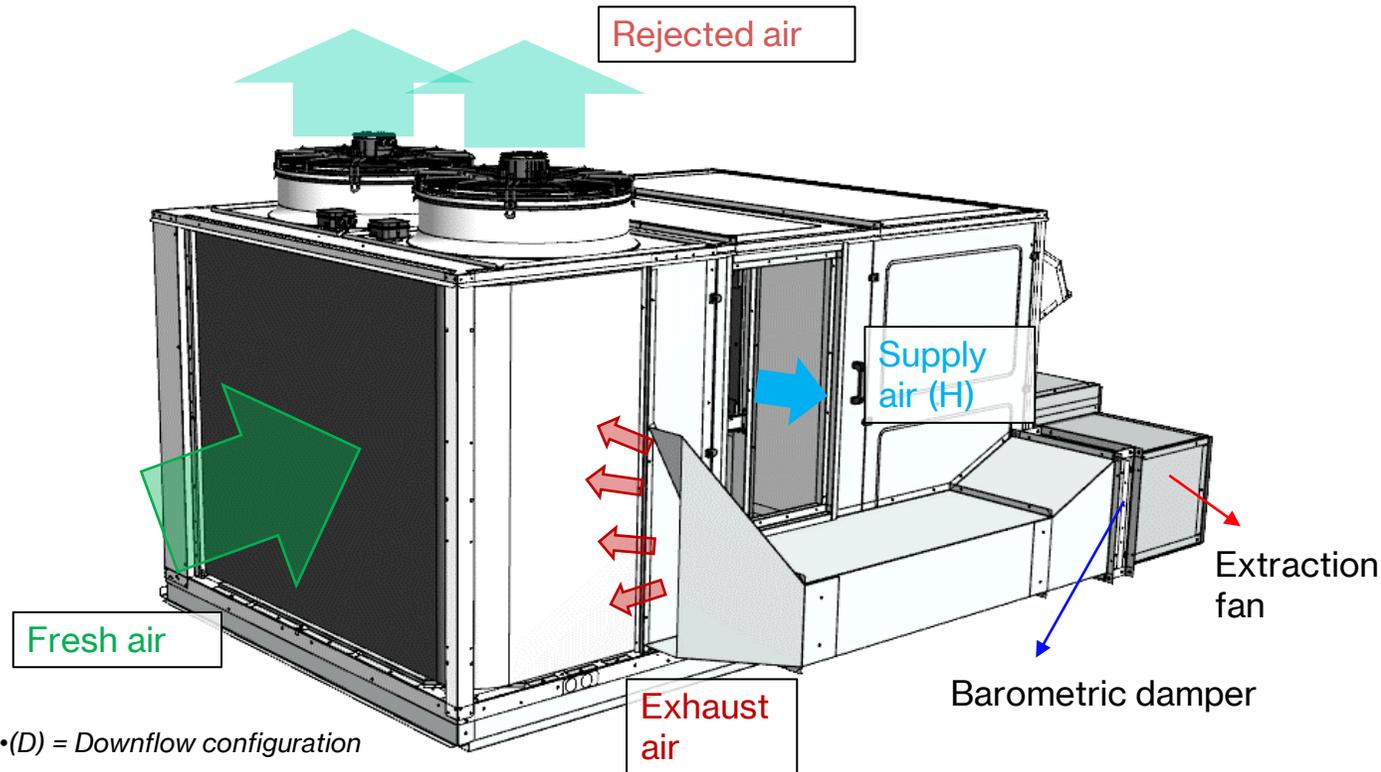
Barometric damper

Extraction fan

- (D) = Downflow configuration
- (H) = Horizontal configuration

# Unit with Thermodynamic heat recovery sizes 017- 036

The rejected air flow is delivered through an external duct in face of the outdoor coil. The *overpressure* in the expulsion duct and the *negative pressure* in front of the outdoor coil force the exhaust air stream through the coil.

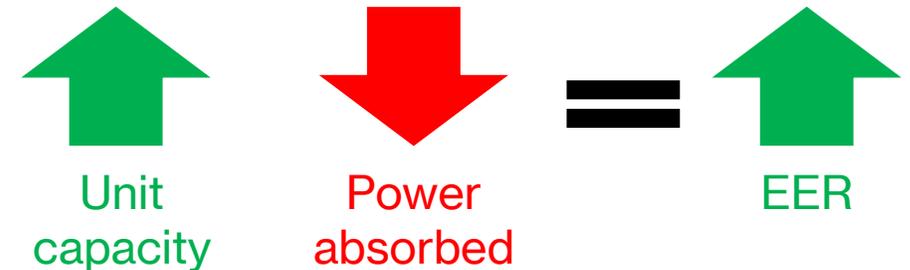


- (D) = Downflow configuration
- (H) = Horizontal configuration

## Advantages:

The effect grants better working conditions to the thermodynamic circuit; the result is:

- ✓ An **increase** of the cooling or heating capacity
- ✓ A **reduced** power absorbed by compressor



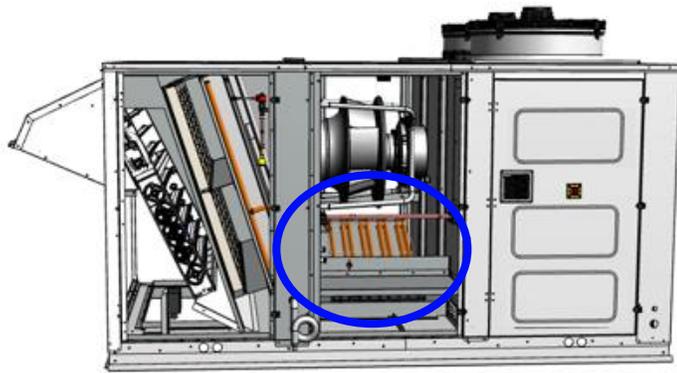
# Airtop pictures

Unit with thermodynamic heat recovery



# Auxiliary heat Options

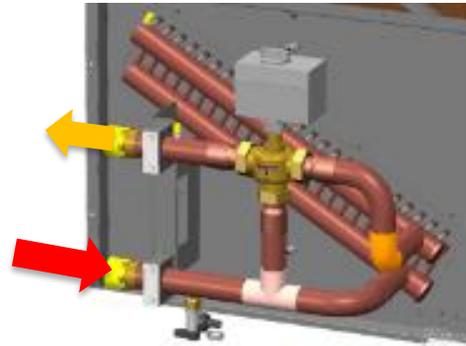
## On Airtop (017- 036)



- Same section for **electric heater**, and **hot water coil**
- Located under the supply fans
- Dedicated horizontal/downflow design

## Hot water coil

- Electrical power consumption is not impacted
- Could take benefits from available hot water (from heat recovery device for example)
- Modulation to ensure a temperature of supply air temperature proportional at the  $\Delta T$



E.g. coupled with a boiler system or a small heat pump

## Electric heater

- No need external energy sources
- Two steps heater for optimized energy consumption



For very small heat loads, are customers concerned with comfort during defrost mode

# airtop



## Packaged heat pump rooftops

15-61 kW heating and cooling capacity  
Inverter-driven compressors  
R454B low-GWP refrigerant

## Focus on applications

# Focus on applications

1. Classic comfort applications and lesser-known applications
2. Replacement of old Trane Voyager™ rooftop units
3. Packaged rooftop system versus a DX system
4. Process applications

# Classic rooftop applications

- ❑ Cool or heat the air-conditioned space for maximum comfort
- ❑ Avoid moisture formation in a supermarket's fridges area (**humidity control** capability)
- ❑ Quickly **renew indoor air** between two shows at a cinema (fresh air and exhaust capability)

## Supermarkets



## Cinemas and retail shops



## Restaurants and cafés

# Lesser-known rooftop applications

Beyond keeping the space at the right temperature, rooftop units are an appreciated solution for their **free-cooling capacities** and reliable **fresh and exhaust air control**.

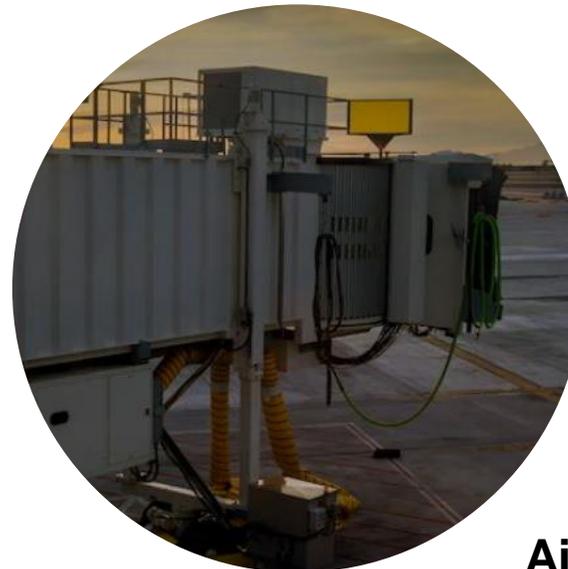
- Cleaner and healthier air
- Less energy used - Lower operating costs
- Lower carbon footprint



Gyms



Gas stations



Airport jetways

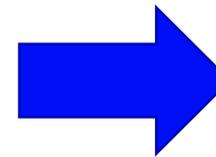
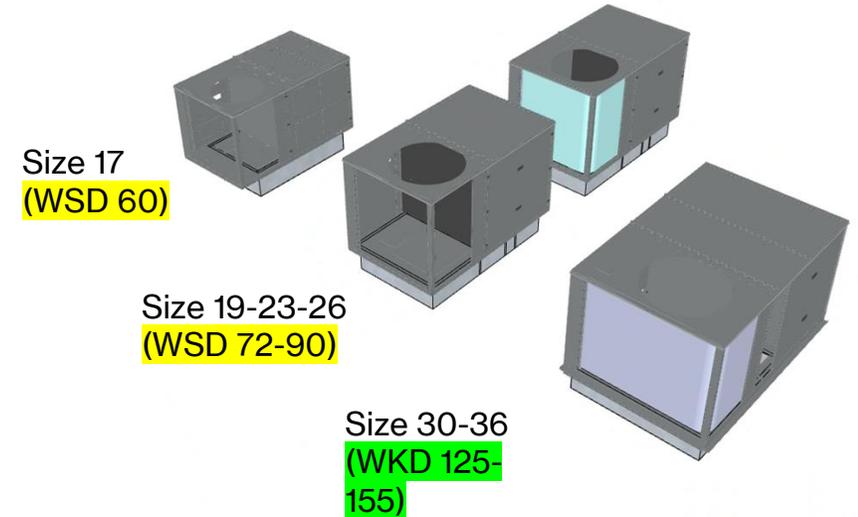
# Replacement of old Voyager™ with Airtop

Units have the same footprint as the Voyager 1 & Voyager 2 roofcurbs

- Saves time on unit selection
- Saves time on the jobsite

## Easy size correspondence reference table

Airfinity S sizes	Voyager I & II sizes			
	Cooling only	Cooling only + Gas burner	Heat pump	Heat pump + gas burner
017	TSD 060	YSD 060	WSD 060	-
019 – 023 - 027	TSD 072, 090, 102, 120	YSD 072, 090, 102, 120	WSD 072, 090	-
030 - 036	TKD 155, 175	YKD 155, 175	WKD 125, 155	DKD 125, 155



# Replacement of old Voyager™ with Airtop - example



Old Voyager™ unit



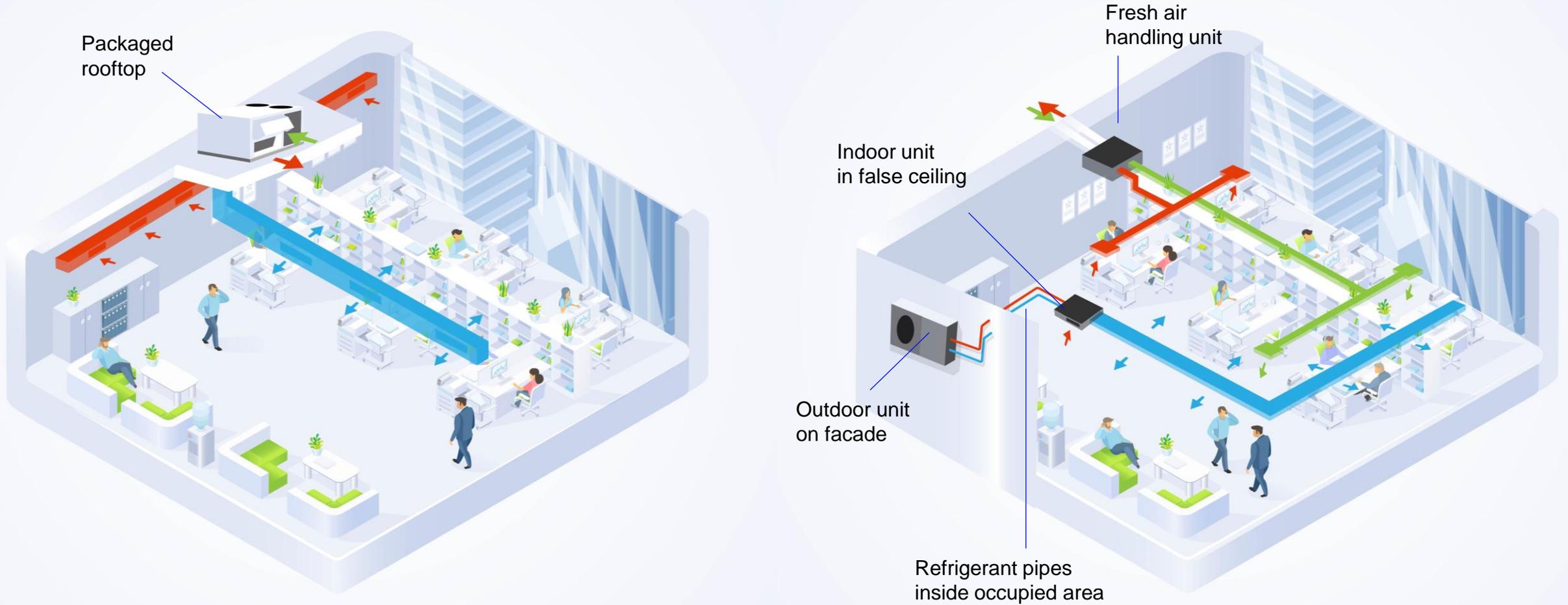
- Application: **Industry comfort**
- Replacement of **2 x Voyager™ WKD 155** (20 years old)

## Advantages of 2 new AIRTOP 036 :

- No adaptive curbs required
- New free-cooling function (was not installed in the old unit)



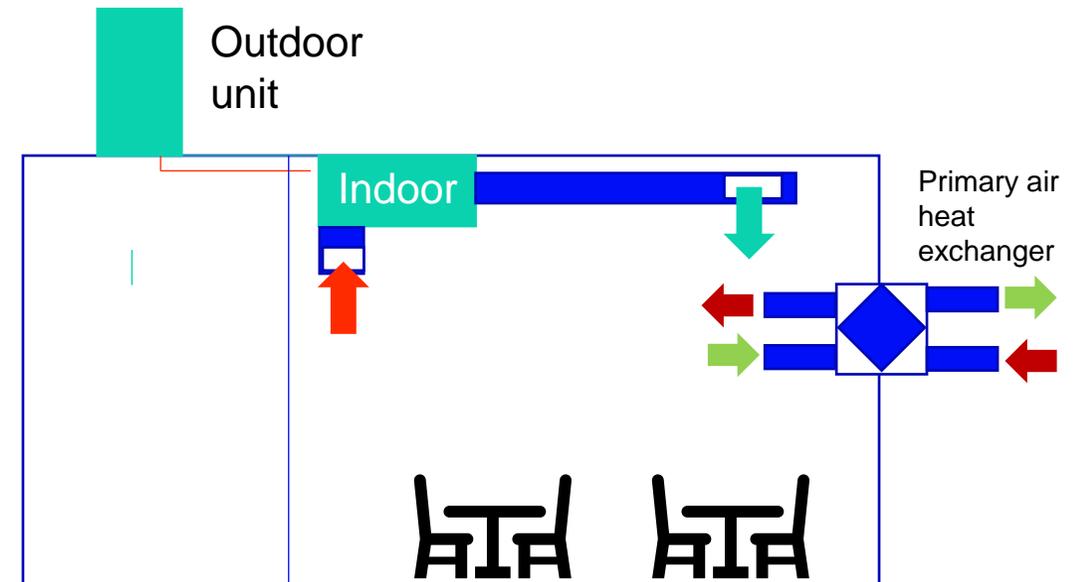
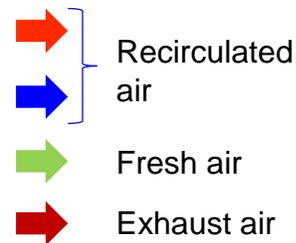
# Airtop versus Multisplit DX units



# Multisplit system + Fresh air handling units

Despite **their attractive first costs**, split and multisplit direct expansion systems have a lot of limits:

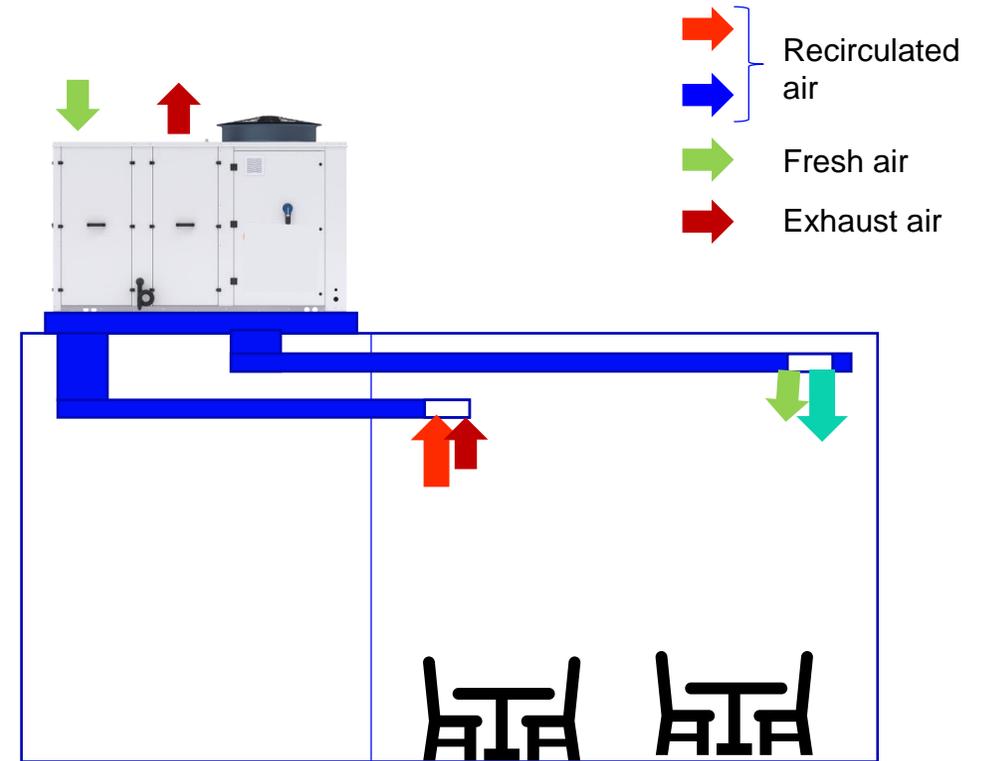
- They require a **separate system for the treatment of the primary (fresh) air**.
- The **pipes that contain the refrigerant cross the served rooms** and therefore they are subject to restrictions and use limitations.
- They **cannot operate in FREE- COOLING** mode, which is very efficient and convenient thanks to the generated energy savings.
- The cost for medium and small installations is often higher as they are more complex and **require more labour for installation, start- up and adjustment**.
- Due to **quick technology obsolescence**, in a relative very short time spare parts are not available, and you cannot replace indoor unit without changing outdoor unit and vice versa, so you must refurbish the entire system.



# Airtop versus Multisplit DX units

## Rooftop unit advantages

- ✓ **All-in-one solution (packaged)** → Cooling, heating *and* ventilation
- ✓ Simpler installation, thanks to roofcurb
- ✓ **Cooling circuit factory sealed**
- ✓ No refrigerant pipes needed inside the building (less restrictions considering EN378 norm)
- ✓ **Complete air treatment** → Temperature, humidity and air quality control
- ✓ **Higher External Static pressure** (up to 500 Pa) - no worries about air duct length or air diffuser pressure drops!
- ✓ **Free cooling management** (also with enthalpy control)
- ✓ **Constant air flow management** (no worries about filter fouling)
- ✓ **Higher filtration capacity** (up to ePM01-80% class according to ISO 16890)
- ✓ Flexibility → **Multiple airflow directions**
- ✓ At the end- of life, **you can simply change the outdoor unit** with a new one, without disturbing the air system distribution



# Process application

Rooftops can be used on **battery storage containers** to keep the batteries in an optimal thermal and hygrometric environment.

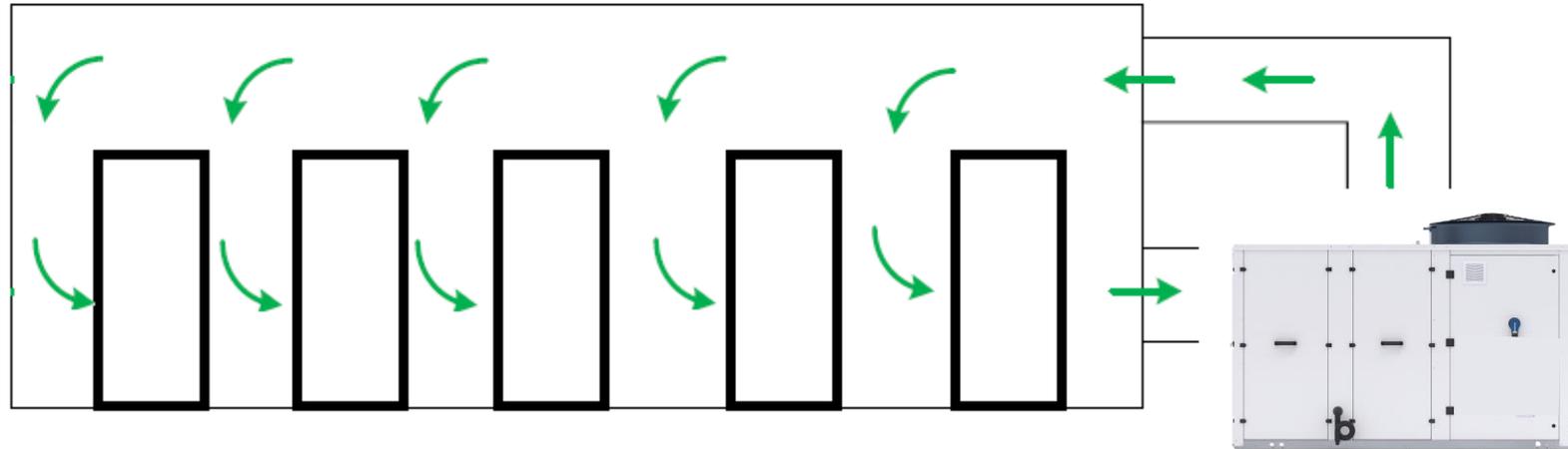
The compact, packaged design of Airfinity S make them an easy fit **on top** of a container.



Cooling of inverter room for windmills energy production in the Netherlands.

# Process application

Battery storage container



SCOPE: Maintain permissible operating temperatures of electric appliances installed in containers.

- Transfer heat dissipated by operation of the batteries (charging and discharging) to the outside.

- Rooftop units are located outside the battery containers and circulate air in a closed loop

- When available, FREE COOLING is used, saving huge amount of energy.